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he was a generous donor. He also took an active interest in the management of King's College and Westminster Hospitals.

He was elected a Fellow of this Society January 11, 1833.

Robert Stirling Newall was born in Dundee on May 27, 1812. Though engaged in commercial business practically the whole of his life, his interests and talents were obviously of a kind that would have made him excel in purely scientific work, had the opportunity for the necessary early training and the external conditions presented themselves. He had a very keen power of observation, unusual patience and perseverance in research, a quiet persistence in following up a line which he knew to be correct in spite of prevalent opinion, and a great confidence in experimental methods. It was an opportunity for experimental work, afforded by Mr. Robert McCalmont, that induced him to give up work in Dundee, where his father's influence had gained him employment in a mercantile office. He came to London, and undertook for Mr. McCalmont experiments on the rapid generation of steam, and turned his mind to various other subjects of an experimental nature.

Always quick in devising mechanical arrangements, he readily seized upon a suggestion made by a friend who was studying mining in Saxony, and wrote that wire ropes of reasonable and efficient construction were greatly needed to take the place of the rough bundles of wire then used in the mining operations. Mr. Newall discovered the essential points in the construction of a good wire rope, and invented machinery to carry out the necessary operations.

In a short memoir in which the chief interest will be centred in astronomical subjects, the reference to Mr. Newall's interest in submarine telegraphy must be very brief, though he was occupied with the matter for at least fifteen years of a very active life. He received some of the first gutta-percha that reached this country; he suggested the wire-rope casing for the insulated telegraph lines; he constructed most of the first submarine cables, and personally took part in the laying of many of them.

In all the ordinary activity of his life between the years 1849 and 1865, when he was personally superintending the construction, testing, and laying of the cables, he still had time and inclination for numerous distinct pursuits, chief amongst them being astronomy. There exists a series of drawings of the sun, made by Mr. Newall and continued by him through the years 1848–1852. He was married on February 14, 1849, to the youngest daughter of the late Mr. Hugh Lee Pattinson, F.R.S. Doubtless it was in great part the intimate connection with Mr. Pattinson following his marriage that kept Mr. Newall's scientific interests alive in these busy years. Astronomy was one of the many subjects in which they found common ground and took practical interest. Mr. Pattinson had a $7\frac{1}{4}$-inch equatoreal by Cooke of York: this was a large glass in those days, when a 15-inch was the largest

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refractor in existence. It was this telescope that Mr. Pattinson put at Professor Piazzi Smyth's disposal for his Teneriffe expedition.

The possibility of the construction and mounting of very large refractors was a subject of very frequent deliberation between Mr. Pattinson and Mr. Newall. It was only after Mr. Pattinson's death—he died in 1858—that unexpectedly the realisation of their dreams became possible. Mr. Newall saw in the Exhibition of 1862 the rough discs of crown and flint glass exhibited by Messrs. Chance, of Birmingham, and after the exhibition he acquired them, and they were transferred to the workshop of Messrs. T. Cooke & Sons, of York. The rough work of grinding and preliminary polishing had proceeded far enough to show the worth of the glass, and the agreement as to the finishing and mounting was completed in September 1863. The finished object-glasses were seen at the meeting of the British Association at Newcastle in 1865, but there were innumerable delays in the completion of the mounting, and it was not till July 1871 that Cooke could say the 25-inch equatoreal was finished. Mr. Newall designed and devised many of the arrangements himself, and helped, urged, and pressed Cooke to finish the work quickly; but when finally the telescope was completed, the plans originally made for its destination were no longer realisable. The telescope and observatory remained in the garden at Ferndene, where it had been set up in order that it might be completely put together before it was moved to a southern climate.

Of the success of at any rate one part of his experiment he was well aware from his own observations with the completed telescope. But had he been no observer himself, external testimony from the best sources would soon have convinced him.

The long delay in the completion of the instrument, which Cooke undertook in 1863 with the promise of finishing within twelve months, was a great disappointment and vexation to Mr. Newall; the more so as in those years of delay his business engagements became of a kind that would not permit him to leave England for any length of time. He scarcely needed the employment of an observer for several years to convince him that the climate of Gateshead was wholly unsuited, or rather impossible, for astronomical observations, and it was out of the question to move an incomplete instrument to a distant country, however favourable, even had his circumstances permitted. But he did not lose sight of his original purpose, and, doing all in his power to secure the completion of his first intentions, he made not one but several offers of his telescope in quarters where he expected the offer would be readily accepted. In 1875, when there was talk of the formation of a Physical Observatory, he had offered the loan of his telescope for application to the development of Physical Astronomy. The reading of *Six Months in Ascension* roused old longings in him again,

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and one result following on it was the offer of the telescope and dome in 1879 for Mr. David Gill's use for seven years at the Cape of Good Hope. The circumstances which led to this offer being declined are already recorded in the *Monthly Notices.** In the last weeks of his life he returned again to his efforts to secure success for his experiment, and on March 2 of last year (1889) proposed to give his telescope to the University of Cambridge, with a view to its being devoted to the study of Stellar Physics.

Mr. Newall was active in local matters, being Mayor of Gateshead in 1867 and again in 1868, an alderman of the borough, and Justice of the Peace. In 1876 he became a representative of the borough on the River Tyne Commission. He became a Fellow of the Royal Society in 1875, a member of the Institute of Mechanical Engineers in 1879, and in 1887 he received the honorary degree of D.C.L. at Durham University. He died in the 77th year of his age, on April 21, 1889.

He was elected a Fellow of this Society May 13, 1864.

Stephen Parkinson was born at Keighley, in the West Riding of Yorkshire, in the year 1823. He received his early education privately, and was subsequently elected to a sizarship at St. John's College, Cambridge, which in due course was changed for a foundation scholarship, as it was evident that he was a student of unusual diligence and ability. In the Mathematical Tripos of 1845 Mr. Parkinson came out as Senior Wrangler, and when it is remembered that the second place was filled by Sir William Thomson, it is plain that his work must have been of more than ordinary excellence. In the competition for the Smith's Prizes, Sir William Thomson asserted his unusual gifts, but Mr. Parkinson easily distanced all others for the second prize.

After this achievement Mr. Parkinson was elected to a fellowship of his college, and settled down to private teaching. He eventually succeeded the Rev. J. B. Mayor as tutor, and to this post, with a lectureship attached, he devoted himself for twenty years. Ordained at Ely upon his fellowship, Mr. Parkinson proceeded B.D. in 1855, and D.D. in 1868. The *Cambridge Review* states that, "As a lecturer he was distinguished by unusual lucidity of exposition, and he published an *Elementary Treatise on Mechanics*, and a *Treatise on Optics*, which had wide vogue among students. As a tutor Dr. Parkinson is remembered by his pupils for his excellent business qualities, especially his care not to spare any trouble in giving explanations by assuming that his pupils already were perfectly acquainted with the matter in hand; but still more for his frankness and kindness of heart." Among his college pupils were four senior wranglers, Moulton, Pendlebury, Ward, and MacAlister.

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* Vol. xl. p. 236.